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EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/501,759	MITCHELL ET AL.	
	Examiner	Art Unit	
	THOMAS H. PARSONS	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35 and 37-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-25,28-35, 37-40 and 42-49* is/are rejected.

7)☒ Claim(s) *8,9,26,27 and 41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/08/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

Reference characters "12a" and "13a" as shown in Figure 1.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The Examiner suggests amending the specification, as appropriate, to include section headings.

3. The disclosure is objected to because of the following informalities:

Page 10, line 11, suggest inserting "42" after "baffles".

Appropriate correction is required.

Claim Objections

4. Claim 41 objected to because of the following informalities:

line 1, suggest changing "any one of claims" to --claim--.

5. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-7, 10-25 and 28-40 and 42-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Tajima (US 4,657,828).

Claim 1: Tajima in Figures 1 and 2 disclose a fuel cell (10) including an anode (12), a cathode (13), and an ion exchange membrane (11) therebetween (see col. 1: 10-19), and having a fuel delivery conduit (20) for supplying fuel from a fuel source to an active surface area of the anode and further comprising means (45) for effecting a controlled combustion of fuel and oxidant species within the fuel delivery conduit (abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim 2: Tajima further discloses that the fuel delivery conduit comprises a fluid flow field plate forming part of the anode (12), having a fluid flow channel extending therethrough; a fuel delivery inlet coupled to one end of the fluid flow channel; and a fuel delivery outlet coupled another end of the fluid flow channel (Figures 1 and 2 shown fuel flow into and out of

the anode. Further, one skilled in the art would know that a convention fuel cell comprises the claimed fluid flow field plate and fluid flow channel.

Claim 3: Tajima further discloses that the means (45) for effecting a controlled combustion of fuel and oxidant species within the fuel delivery conduit comprises: a recirculation conduit extending between the fuel delivery outlet and a mixing point (45) in the fuel delivery inlet (see Figure 2), and a fluid flow regulator (41) coupled to the mixing point.

Claim 4: Tajima further disclose that the mixing point comprises a reaction chamber (45). The recitation "for reacting fuel from said fluid flow regulator with oxidant species from said recirculation conduit" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 5: Tajima further discloses that the reaction chamber (45) includes a catalyst material (col. 3: 17-20).

Claim 6: Tajima further discloses that the mixing point comprises a pre-mixing chamber.

The recitation "for mixing fuel from said fluid flow regulator with oxidant species from said recirculation conduit" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the mixing point of Tajima is the same as that instantly disclosed, it inherently would provide a pre-mixing chamber for mixing fuel from said fluid flow regulator with oxidant species from said recirculation conduit.

Claim 7: Tajima further discloses recirculation conduit is switchably connected to the fuel delivery outlet by way of a two way valve (valve 42 which is structurally the same as that instantly disclosed).

Claim 10: Tajima further disclose a control means for switching the fuel cell between a normal mode of operation (42, 44, 47, and 48) and a recirculation mode (42, 44, 47, and 48).

Claim 11: The rejection of claim 11 is as set forth above in claim 10.

Claim 12: Tajima further discloses an oxidant supply conduit extending from an oxidant supply (31) to a mixing point (45) in the fuel delivery inlet.

Claim 13: Tajima further discloses an oxidant flow regulator (43).

Claim 14: Tajima further discloses a valve (44, 47) coupling the oxidant supply conduit to a cathode oxidant delivery conduit.

Claim 15: Tajima further discloses a reaction chamber (45). The recitation "for reacting fuel from said fluid flow regulator with oxidant species from said oxidant supply conduit" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 16: Tajima further discloses that the reaction chamber includes a catalyst material (col. 3: 17-20).

Claim 17: Tajima further discloses a means (45) for effecting a controlled combustion of fuel and oxidant species within a cathode fluid delivery conduit.

Claim 18: Tajima further discloses cathode fluid delivery conduit (30) comprising a fluid flow field plate forming part of the cathode (13), having a fluid flow channel extending therethrough; an oxidant delivery inlet coupled to one end of the cathode fluid flow channel; and an exhaust outlet coupled to another end of the cathode fluid flow channel (Figure 2 shows an

oxidant inlet and an exhaust outlet). Further, one skilled in the art would know that a convention fuel cell comprises the claimed fluid flow field plate and fluid flow channel.

Claim 19: Tajima further discloses a fuel supply conduit extending from a fuel supply (21) to a mixing point (45) in the oxidant delivery inlet.

Claim 20: Tajima further disclose that the mixing point comprises a reaction chamber (45). The recitation "for reacting fuel from said fuel supply conduit with oxidant species from said oxidant supply" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 21: Tajima in Figures 1 and 2 disclose a fuel cell system including:

a fuel cell (10) having an anode (12), a cathode (13), and an ion exchange membrane (11) therebetween (see col. 1: 10-19);

a fuel delivery conduit comprising:

a fluid flow field plate forming part of the anode (12), having a fluid flow channel extending therethrough;

a fuel delivery inlet coupled to one end of the fluid flow channel; and a fuel delivery outlet coupled another end of the fluid flow channel (Figures 1 and 2 show fluid flowing into and out of the anode);

the fuel cell system further comprising a recirculation conduit extending between the fuel delivery outlet and a mixing point in the fuel delivery inlet (as shown in Figure 2) (abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim 22: Tajima further disclose a fluid flow regulator (41) coupled to the mixing point.

Claim 23: Tajima further discloses a mixing point comprising a reaction chamber (45). The recitation "for reacting fuel from said fluid flow regulator with oxidant species from said recirculation conduit" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 24: The rejection of claim 6 is as set forth above in claim 6.

Claim 25: Tajima further discloses that the recirculation conduit is switchably connected (via 42, 47) to the fuel delivery outlet by way of a two way valve.

Claims 28 and 29: The rejection of claims 28 and 29 are as set forth above in claim 10. 29. A fuel cell system according to claim 21 further including control means for switching the fuel cell between a normal mode of operation in which a relatively high flow rate of fuel is delivered to the anode and oxidant is delivered to the cathode, and a recirculation mode in which a relatively low flow rate of fuel is delivered into the fuel delivery conduit together with oxidant delivered via the recirculation conduit.

Claim 30: Tajima in Figures 1 and 2 disclose a fuel cell system including:

a fuel cell (10) having an anode (12), a cathode (13), and an ion exchange membrane (11) therebetween (see col. 1: 10-19);

a fuel delivery conduit (20) coupled to the anode comprising:

a reaction chamber (45);

a fuel supply (21) inlet coupled to the reaction chamber;

an oxidant supply (31) coupled to the reaction chamber; and

a reaction chamber outlet connected to the anode (via 47). See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

The recitation "the reaction chamber being adapted so that at least a part of the fuel supply delivered thereto to is reacted with the oxidant supplied thereto to precondition the fuel being delivered to the anode" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function.

Claim 31: Tajima further discloses control means (41, 43) for controllably varying the flow rate of one or both of the fuel and oxidant.

Claim 32: Tajima further discloses control means (41, 43) for controllably varying the flow rate of one or both of the fuel and oxidant.

Claim 33: A fuel cell system including:

a fuel cell (10) having an anode (12), a cathode (13), and an ion exchange membrane (11) therebetween (see col. 1: 10-19);

an oxidant delivery conduit (30) coupled to the cathode comprising:

a reaction chamber (45);

a fuel supply (21) inlet coupled to the reaction chamber;

an oxidant supply (31) inlet coupled to the reaction chamber; and

a reaction chamber (45) outlet (via 48) connected to the cathode. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

The recitation "the reaction chamber being adapted so that at least a part of the oxidant supply delivered thereto is reacted with the fuel supplied thereto to precondition the oxidant

being delivered to the cathode" has been considered, and construed as function language that adds no additional structural limitation to the fuel. However, because the reaction chamber of Tajima is the same as that instantly disclosed it appears capable of providing the claimed function. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim 34: Tajima further discloses a control means (41, 43) for controllably varying the flow rate of one or both of the fuel and oxidant.

Claim 35: Tajima further discloses a control means (41, 43) for controllably varying the flow rate of one or both of the fuel and oxidant.

Claim 37: Tajima in Figures 1 and 2 disclose a method of operating a fuel cell (10) having an anode (12), a cathode (13), and an ion exchange membrane (13) therebetween, comprising the steps of:

supplying fuel from a fuel source (21) to an active surface area of the anode (12) by way of a fuel delivery conduit; and

effecting a controlled combustion (via 45) of fuel and oxidant species within the fuel delivery conduit. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Further, because the structure of the fuel cell system of Tajima is structurally the same as that instantly disclosed for carry out the claimed method, the fuel cell system would inherently perform the claimed method.

Claim 38: The rejection is as set forth above in claim 37 wherein further Tajima discloses a step of recirculating fluid within the fluid delivery conduit (see Figure 1) to a mixing point (45) upstream of the active surface area of the anode (12).

Claim 39: The rejection is as set forth above in claim 37 wherein further Tajima discloses a step of consuming oxidant species at the mixing point, in a reaction chamber (45).

Claim 40: The rejection is as set forth above in claim 37 wherein further Tajima discloses a step of controllably varying the quantity of fuel (via 41) delivered to the mixing point.

Claim 42: The rejection of claim 42 is as set forth above in claim 37 wherein further Tajima discloses switching (via 42, 44, 47, 48) the fuel cell between a normal mode of operation in which a relatively high flow rate of fuel is delivered to the anode and oxidant is delivered to the cathode, and a recirculation mode in which a relatively low flow rate of fuel is delivered to the anode together with oxidant delivered in the recirculated fluid.

Claim 43: The rejection of claim 43 is as set forth above in claim 37 wherein further Tajima discloses switching (via 42, 44, 47, 48) the fuel cell between a normal mode of operation in which a relatively high flow rate of fuel is delivered to the anode and oxidant is delivered to the cathode, and a recirculation mode in which a relatively low flow rate of fuel is delivered into the fuel delivery conduit together with oxidant delivered in the recirculation fluid.

Claim 44: Tajima in Figures 1 and 2 disclose a method of operating a fuel cell (10) having an anode (12), a cathode (13), and an ion exchange membrane (11) therebetween (see col. 1: 10-19), comprising the steps of:

supplying fuel from a fuel source (21) to an active surface area of the anode (12) by way of a fuel delivery conduit (20); and

reacting fuel (21) and oxidant (31) in a reaction chamber (45) upstream of the anode to precondition the fuel being delivered to the anode. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim 45: Tajima further discloses controlling the flow (via 41, 43) rate of one or both of the fuel and oxidant in order to achieve a predetermined degree of humidification of the fuel stream delivered to the anode. Because the structure of the fuel cell system is structurally the same as that instantly disclosed, controlling the flow would inherently achieve a predetermined degree of humidification of the fuel stream delivered to the anode.

Claim 46: Tajima further discloses controlling (via 41 or 43) the flow rate of one or both of the fuel and oxidant in order to achieve a predetermined degree of pre-heat of the fuel stream delivered to the anode. Because the structure of the fuel cell system is structurally the same as that instantly disclosed, controlling the flow would inherently achieve a predetermined degree of pre-heat of the fuel stream delivered to the anode.

Claim 47: Tajima in Figures 1 and 2 disclose method of operating a fuel cell having an anode (12), a cathode (13), and an ion exchange membrane (11) (col. 1: therebetween, comprising the steps of:

supplying oxidant from an oxidant source (31) to an active surface area of a cathode (13) by way of an oxidant delivery conduit (30); and reacting fuel and oxidant in a reaction chamber (45) upstream of the cathode to preconditioned the oxidant being delivered to the cathode. See abstract, col. 1: 19-33 and col. 2: 50-col. 4: 25).

Claim 48: Tajima further discloses controlling (via 41 or 43) the flow rate of one or both of the fuel and oxidant in order to achieve a predetermined degree of humidification of the

oxidant stream delivered to the cathode. Because the structure of the fuel cell system is structurally the same as that instantly disclosed, controlling the flow would inherently achieve a predetermined degree of humidification of the fuel stream delivered to the anode.

Claim 49: Tajima further discloses controlling (via 41 or 43) the flow rate of one or both of the fuel and oxidant in order to achieve a predetermined degree of pre-heat of the oxidant stream delivered to the cathode. Because the structure of the fuel cell system is structurally the same as that instantly disclosed, controlling the flow would inherently achieve a predetermined degree of pre-heat of the fuel stream delivered to the anode.

Allowable Subject Matter

8. Claims 8-9, 26-27 and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indicating Allowable Subject Matter

A search of the prior art references of record failed to teach or suggest what is instantly claimed, in particular,

A fuel cell comprising detection means for detecting a level of oxidant species present in at least part of the fuel delivery conduit, in which the detection means comprises means for testing an open circuit voltage across the anode and cathode of the fuel cell, as set forth in claims 8-9 and 26-27.

A method of operating a fuel cell further comprising a step of detecting a level of oxidant species present in at least part of the fuel delivery conduit, as set forth in claim 41.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS H. PARSONS whose telephone number is (571)272-1290. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Thomas H Parsons
Examiner
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